

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2005/003052

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl⁷ C12N15/09, C07H21/04, C12N9/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl⁷ C12N15/09, C07H21/04, C12N9/22

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

| | | | |
|---------------------------|-----------|----------------------------|-----------|
| Jitsuyo Shinan Koho | 1922-1996 | Jitsuyo Shinan Toroku Koho | 1996-2005 |
| Kokai Jitsuyo Shinan Koho | 1971-2005 | Toroku Jitsuyo Shinan Koho | 1994-2005 |

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 JICST FILE (JOIS), EUROPAT (QUESTEL), MEDLINE/BIOSIS/WPIDS (STN),
 SwissProt/PIR/GeneSeq, Genbank/EMBL/DDBJ/GeneSeq

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|-----------------------|
| X | Tetsu YAMAZAWA et al., "Kakusan Kino no Hikari Seigyo o Mezashita Shushoku Oligonucleotide no Sekkei", Azobenzene Donyu ni yoru DNA Enzyme no Hikari Seigyo", Polymer Preprints, Japan, 50(5), 2001, page 977 | 1-7 |
| A | S.W. Santoro, et al., A general purpose RNA-cleavings DNA etzyme, Proc.Natl.Acad.Sci., USA, 94(9), 1997, p. 4262-6 | 1-7 |
| A | H. ASANUMA, et al., Photo-responsive oligonucleotides carrying azobenzene in the side-chains, Tetrahedron Letters, 39(49), 1998, p. 9015-8 | 1-7 |

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search
11 April, 2005 (11.04.05)Date of mailing of the international search report
26 April, 2005 (26.04.05)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|-----------------------|
| T | Y. Lin, et al., Light-regulated Catalysis by an RNA-cleaving Deoxyribozyme, Journal of Molecular Biology, 341(4), 2004.08, p.887-92 | 1-7 |
| T | Takeshi KURAMOCHI et al., "Azobenzene Donyu ni yoru DNA Enzyme no Kokinoka", CSJ: The Chemical Society of Japan Koen Yokoshu, 84(2), 11 March, 2004 (11.03.04), page 1070 | 1-7 |

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: parts of 1, 2 and 4 to 6
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
See extra sheet.

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

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Continuation of Box No.II-2 of continuation of first sheet (2)

Claims 1 and 5

It is unknown what position corresponds to "the end in the 3'-side" as set forth in the above claims. It is unknown whether DNA-2A and DNA-3A given in Table 3 correspond to examples having azobenzene transferred into "the end in the 3'-side" or not. Therefore, it appears that the above claims are not clearly described.

Claims 1, 2, 4 and 6

It is unknown the "derivatives" as set forth in the above claims mean compounds of what structure in practice. Therefore, it appears that the above claims are not clearly described.

It is also unknown what compounds other than the compounds presented in EXAMPLES, etc. are involved in the scope of the "derivatives". Thus, the inventions according to the above claims are neither sufficiently supported by the description nor disclosed therein in a manner sufficiently clear and complete for the inventions to be carried out by a person skilled in the art.

Claims 1, 2 4 and 6

Concerning the "DNA enzyme" as set forth in the above claims, those relating to "azobenzene" are exclusively indicated as being useful in EXAMPLES, etc. Namely, it is unknown whether or not other DNA enzymes relating to spiropyran and stilbene are also useful. Thus, the inventions according to the above claims are neither sufficiently supported by the description nor disclosed therein in a manner sufficiently clear and complete for the inventions to be carried out by a person skilled in the art.

Claims 1 and 4

It is unknown what compounds correspond to "a nucleotide residue carrying an organic group selected from the group consisting of azobenzene, ..." as set forth in the above claims. Although a "DNA enzyme" according to the above claims is represented by the formula given in claim 2, for example, the organic group transferred between "A" and "B" is not a nucleotide residue. Thus, it does not appear that the above claims are clearly described.

No search was made on the inventions which are claimed in claims not clearly described as discussed above or which are neither sufficiently supported by the description nor disclosed therein in a manner sufficiently clear and complete.